WHAT IS CLAIMED IS:

1. An information recording medium comprising a first information layer and a second information layer,

wherein the first information layer comprises a first recording layer in which a reversible phase change is caused between a crystalline phase and an amorphous phase by irradiation of a laser beam or Joule heat generated by application of current,

the second information layer comprises a second recording layer in which a reversible phase change is caused between a crystalline phase and an amorphous phase by the irradiation of the laser beam or the Joule heat generated by the application of the current,

the first recording layer is made of a first material,

the second recording layer is made of a second material, and

the first material is different from the second material.

2. The information recording medium according to claim 1, wherein the first material comprises Ge, Sb, and Te, and

the second material comprises Sb, Te, and at least one element M1 selected from the group consisting of Ag, In, Ge, Sn, Se, Bi, Au and Mn.

3. The information recording medium according to claim 2, wherein the first material is represented by a composition formula:

$Ge_aSb_bTe_{3+a}$, where $0 < a \leq 10$ and $1.5 \leq b \leq 4$.

4. The information recording medium according to claim 2, wherein the first material is represented by a composition formula:

$(Ge\text{-}M2)_aSb_bTe_{3+a}$, where M2 is at least one element selected from the group consisting of Sn and Pb, and $0 < a \leq 10$ and $1.5 \leq b \leq 4$.

5. The information recording medium according to claim 2, wherein the first material is represented by a composition formula:

$(Ge_aSb_bTe_{3+a})_{100-c}M3_c$, where M3 is at least one element selected from the group consisting of Si, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Se, Zr, Nb, Mo, Ru, Rh, Pd, Ag, In, Sn, Ta, W, Os, Ir, Pt, Au and Bi, and $0 < a \leq 10$, $1.5 \leq b \leq 4$, and $0 < c \leq 20$.

6. The information recording medium according to claim 2, wherein the second material is represented by a composition formula:

$(Sb_xTe_{100-x})_{100-y}M1_y$, where $50 \leq x \leq 95$ and $0 < y \leq 20$.

7. The information recording medium according to claim 1, wherein

in the first and second recording layers, a reversible phase change is caused by the irradiation of the laser beam,

the first information layer is disposed closer to a side from which the laser beam is incident than the second information layer, and

a melting point of the second material is lower than that of the first material.

8. The information recording medium according to claim 2, wherein

in the first and second recording layers, a reversible phase change is caused by the irradiation of the laser beam, and

the first information layer is disposed closer to a side from which the laser beam is incident than the second information layer.

9. The information recording medium according to claim 7, wherein a thickness of the first recording layer is 9nm or less.

10. The information recording medium according to claim 7, wherein a thickness of the second recording layer is in a range of 6nm to 15nm.

11. The information recording medium according to claim 7, wherein a transmittance Tc (%) of the first information layer when the first recording layer is in a crystalline phase and a transmittance Ta (%) of the first information layer when the first recording layer is in an amorphous phase satisfy $40 \leq (Tc + Ta)/2$ with respect to the laser beam having a wavelength in the range of 390nm to 430nm.

12. The information recording medium according to claim 7, further comprising an optically separating layer disposed between the first information layer and the second information layer,

wherein the first information layer further comprises a first substrate, a first lower protective layer, a first upper protective layer, and a first reflective layer,

the second information layer further comprises a second lower protective layer, a second upper protective layer, a second reflective layer, and a second substrate, and

the first substrate, the first lower protective layer, the first recording layer, the first upper protective layer, the first reflective layer, the optically separating layer, the second lower protective layer, the second recording layer, the second upper protective layer, the second reflective layer, and the second substrate are disposed in this order from the side from which the laser beam is incident.

13. The information recording medium according to claim 12, further comprising a transparent layer disposed between the first substrate and the first lower protective layer.

14. The information recording medium according to claim 12, further comprising an interface layer disposed at at least one interface selected from the group consisting of an interface between the first lower protective layer and the first recording layer and an interface between the first upper protective layer and the first recording layer.

15. The information recording medium according to claim 12, further comprising an interface layer disposed at at least one interface selected from the group consisting of an interface between the second lower protective layer and the second recording layer and an interface between the second upper protective layer and the second recording layer.

16. The information recording medium according to claim 12, further comprising an interface layer disposed at at least one interface selected from the group consisting of an interface between the first upper protective layer and the first reflective layer and an interface between the second upper protective layer and the second reflective layer.

17. The information recording medium according to claim 12, further comprising a transmittance adjusting layer for adjusting a transmittance of the first information layer between the first reflective layer and the optically separating layer.

18. The information recording medium according to claim 17, further comprising an interface layer disposed between the first reflective layer and the transmittance adjusting layer.

19. The information recording medium according to claim 12, wherein a thickness of the first substrate is in a range of 10μm to 800μm.

20. The information recording medium according to claim 12, wherein a thickness of the second substrate is in a range of 400μm to 1300μm.

21. The information recording medium according to claim 2, further comprising first and second electrodes, wherein

in the first and second recording layers, a reversible phase change is caused by the application of the current, and

the first recording layer, the second recording layer and the second electrode are laminated over the first electrode in this order.

22. The information recording medium according to claim 21, further comprising an intermediate electrode disposed between the first recording layer and the second recording layer.

23. A method for producing an information recording medium comprising a first information layer and a second information layer, the method comprising:

(a) forming the first information layer; and

(b) forming the second information layer,

wherein the first information layer comprises a first recording layer in which a reversible phase change is caused between a crystalline phase and an amorphous phase by irradiation of a laser beam or Joule heat generated by application of current,

the second information layer comprises a second recording layer in which a reversible phase change is caused between a crystalline phase and an amorphous phase by the irradiation of the laser beam or the Joule heat generated by the application of the current,

the process (a) comprises forming the first recording layer with a base material containing Ge, Sb, and Te,

the process (b) comprises forming the second recording layer with a base material containing Sb, Te, and at least one element M1 selected from

the group consisting of Ag, In, Ge, Sn, Se, Bi, Au and Mn.

24. The method for producing an information recording medium according to claim 23, wherein the first and second recording layers are formed by sputtering using sputtering gas containing argon gas or krypton gas.

25. The method for producing an information recording medium according to claim 24, wherein the sputtering gas further contains at least one gas selected from the group consisting of nitrogen gas and oxygen gas.

26. The method for producing an information recording medium according to claim 24, wherein

a thickness of the first recording layer is 9nm or less, and

in the process (a), the first recording layer is formed at a film formation rate in a range of 0.1nm/sec. to 3nm/sec.

27. The method for producing an information recording medium according to claim 24, wherein

a thickness of the second recording layer is in a range of 6nm to 15nm, and

in the process (b), the second recording layer is formed at a film formation rate in a range of 0.3nm/sec. to 10nm/sec.

28. The method for producing an information recording medium according to claim 23, wherein

the process (b) is performed before the process (a), and

after the process (b) and before the process (a), the method further comprises a process (c) of forming an optically separating layer over the second information layer, and

in the process (a), the first information layer is formed over the optically separating layer.

29. A method for recording/reproducing an information recording medium, wherein

the information recording medium is the information recording medium according to claim 1,

with respect to the first information layer of the information recording

medium, information is recorded/reproduced with a laser beam incident from a side of the first information layer,

with respect to the second information layer of the information recording medium, information is recorded/reproduced with the laser beam that has passed through the first information layer, and

a wavelength of the laser beam is in the range of 390nm or more and 430nm or less.

30. The method for recording/reproducing an information recording medium according to claim 29, wherein

a linear velocity of the information recording medium when recording/reproducing information is in the range of 3m/sec. or more and 30m/sec. or less.

31. The method for recording/reproducing an information recording medium according to claim 29, wherein

the laser beam is focused by an objective lens, and

a numerical aperture NA of the objective lens is in the range of 0.5 or more and 1.1 or less.

32. A method for recording/reproducing an information recording medium, wherein

the information recording medium is the information recording medium according to claim 1,

in the first and second recording layers of the information recording medium, a reversible phase change is caused between a crystalline phase and an amorphous phase by Joule heat generated by application of current, and

an amplitude Ic, a pulse width tc, an amplitude Ia1, a pulse width ta1, an amplitude Ia2 and a pulse width ta2 satisfy the relationships:

$Ic < Ia2 < Ia1$ and $ta1 \leq tc$ or $ta2 \leq tc$, wherein

a current pulse with the amplitude Ic and the pulse width tc is applied to the first or second recording layer to change the first or second recording layer from an amorphous phase to a crystalline phase,

a current pulse with the amplitude Ia1 and the pulse width ta1 is applied to the first recording layer to change the first recording layer from a crystalline phase to an amorphous phase, and

a current pulse with the amplitude Ia2 and the pulse width ta2 is

applied to the second recording layer to change the second recording layer from a crystalline phase to an amorphous phase.